

# Forensic Footwear Activities

## Activity 4 – 2D & 3D Footwear Impressions.

Footwear impressions can be two-dimensional (2D) or three-dimensional (3D) in form, depending on whether the surface that has been stepped on is hard or soft. Part 1 will explore 2D impressions, using practical activities to show you how to examine and recover each type of 2D impression evidence. Part 2 will explore 3D impressions and the techniques used to recover them including casting and photography. So line up some “suspects” (some old shoes) and have a look at what impressions they make!!



Figure 1: 2D impression oil on paper



Figure 2: 3D impression in the mud

## Part 1 - 2D Footwear Impressions

2D impressions may be left on a flat surface when dry particles are left behind (e.g. flour onto the floor), wet particles being left behind on a hard surface (e.g. soil), or in a liquid on the surface (e.g. a paint puddle). Many impressions are not readily visible with the naked eye, these are called latent impressions. Searching the scene using a high intensity light at various angles helps the crime scene investigator locate these impressions.

### Task 1 – Dry 2D impressions



*What you will need: Flour and a camera, a clean tray if you wish.*

1. Sprinkle the flour evenly on a flat surface, for ease of cleaning this can be done in a tray on the floor.
2. Step in the flour with one of the shoes on, then step on the floor (or a clean tray).
3. This should leave an impression in the flour tray where the flour has been removed by your shoe and an impression where the flour has been deposited on the clean floor/tray.
4. Take a photograph on both impression that you have made, using a scale or ruler.

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## Extra steps

5. Use a rectangle of sticky back plastic, cut to size. Carefully lay the plastic sheet over the 2<sup>nd</sup> impression on the floor or clean tray sticky side down and gently smooth down.
6. Carefully lift the sticky back plastic and place sticky side down onto a dark piece of paper or a clear acetate.

## Task 2 – Wet 2D impressions

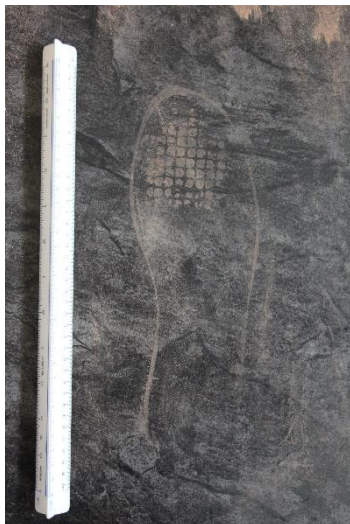
*What you will need: Tray, water based paint, sheet of plain paper, a scale and a camera.*

1. Pour a very thin layer of water based paint in a tray and a piece of plain paper in front on the tray.
2. Allow the paint to start to dry so it is still wet but a thin film has begun to form on the surface.
3. Using an old shoe, roll the shoe in the paint then roll the same shoe on the piece of paper.
4. Take a photograph of both impressions you have made, using a scale or ruler.



## Task 3 – Latent 2D impressions

*What you will need: Plain paper, cooking spray, cocoa or hot chocolate powder and a camera.*

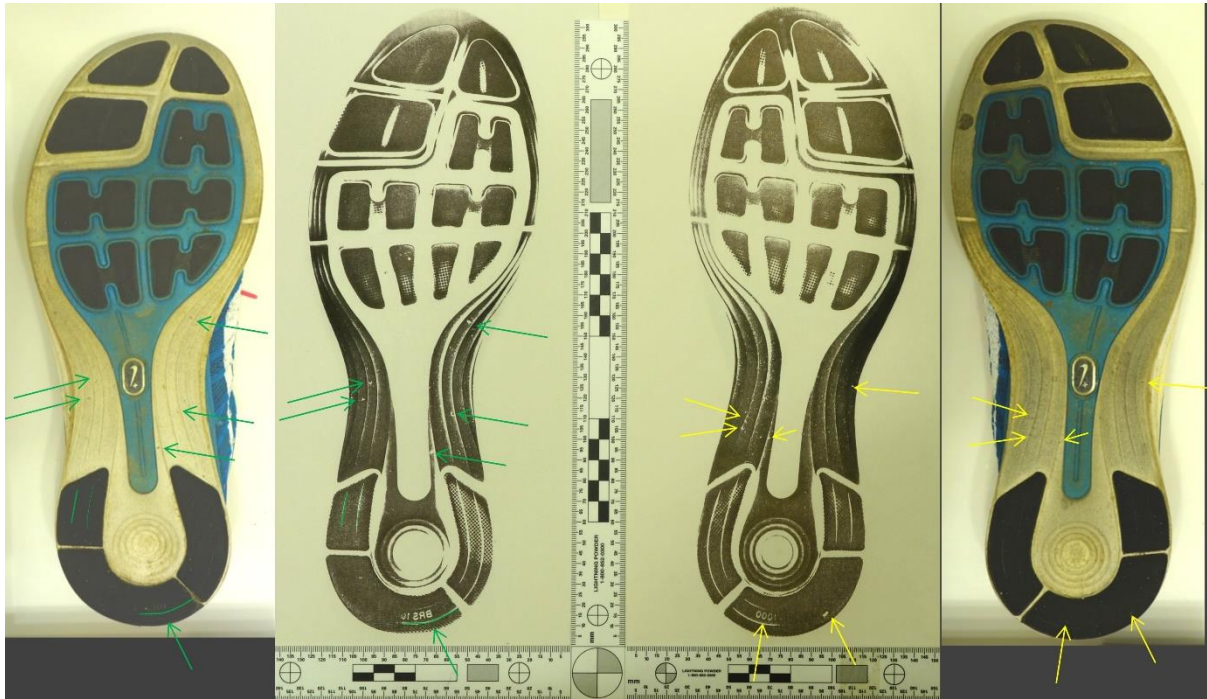


1. Place a sheet of plain paper on the table.
2. Spray the under sole of an old shoe with cooking spray and roll the shoe on the sheet of paper.
3. Leave for a few minutes to dry.
4. Using a bright torch, shine it at the print at different angles to see if you can view the impression.
5. Now, using a paintbrush lightly dust the surface with a powder such as cocoa powder or hot chocolate, this will adhere to the oil and create an impression. Be careful not to brush too hard, you should just skim the surface otherwise you may damage the impression.
6. Blow away the excess powder, then photograph, using a scale or ruler.

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## Task 4 – Examination

1. Look at your range of footwear impressions closely with a magnifying glass or zoom in on the photographs and see if you can find any accidental features like cuts in the tread or unique marks. This is how criminals are caught!



*Each of the activities can be repeated using different substances (e.g. water, wet and dry soil, icing sugar). You can evaluate which substances give better impressions.*

*NB: At a crime scene, 2D footprints can be found in/made from mud, blood & other bodily fluids.*

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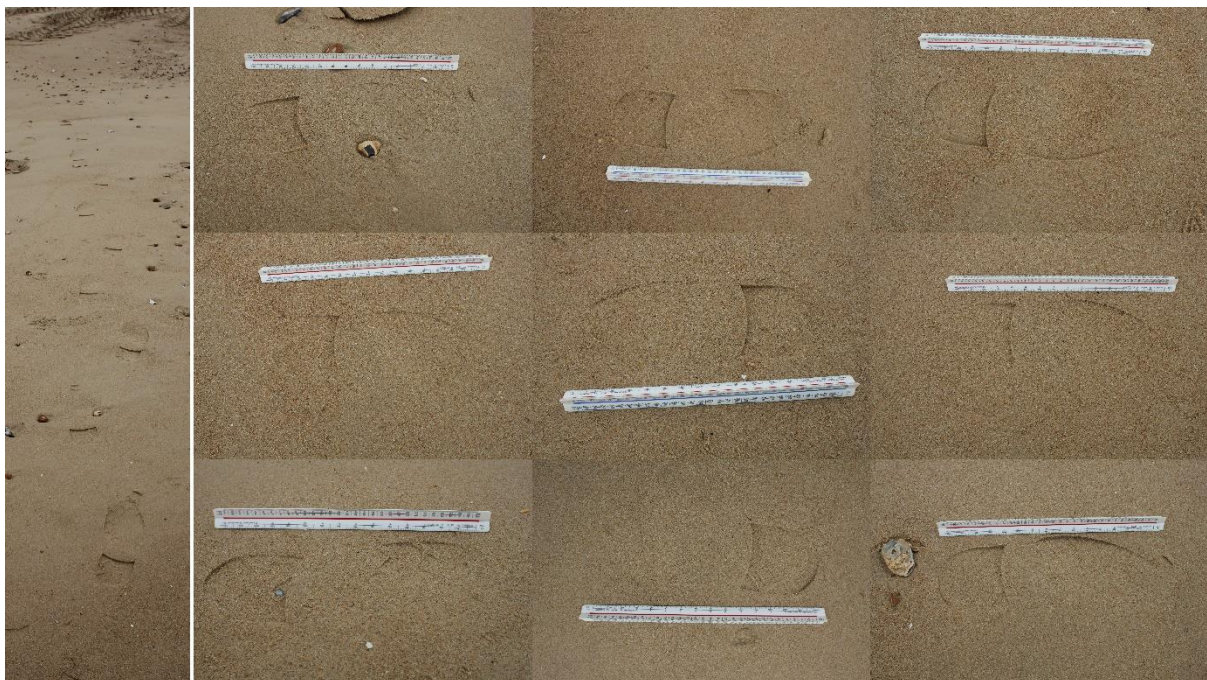
## Part 2 - 3D Footwear Impressions

3D footwear impressions are left in soft media such as sand, mud and loose soil.

### Task 4 –

*What you will need: An area with soft ground suitable to walk through and a camera.*

1. Look for an area that you think will be suitable to make a 3D impression of your footwear. This could be an area of soil, a sand pit or if your school has one, a long jump pit for example. Then, if you have enough room you can do the next three steps next to each other to compare the actual impressions. If not, you can do each set individually and photograph your tracks and compare the photographs.
  - a. Walk normally through the area as you would walk normally.
  - b. Run through the area.
  - c. Carry something large or heavy through the area (be careful not to injure yourself).
2. Next, carefully observe the different impressions you have made. Either the actual impressions or the photographs.
3. Can you see any differences between the three sets of impressions? Is there enough detail in your impression to use it to identify your shoe? Can the brand name or logo be seen in the impression?



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## Task 5 – Casting a footwear impression

*What you will need: Tray, damp sand, casting frame, 1kg dental stone or equivalent plaster of paris, 500ml water and hairspray.*

1. Fill a tray with damp sand and place a casting frame big enough for you to stand in inside the tray.
2. Step in the tray with one foot only, leaving an impression in the tray.
3. In a zip lock bag, mix 1kg dental stone with 500ml of water.
4. Mix thoroughly working the bag between your fingers and thumb ensuring there are no lumps.
5. Gently pour the dental stone into the impression starting at an edge, be careful not to pour it too quickly or onto the impression as this may damage the impression.
6. Leave to set, this will take around 30 minutes.
7. Carefully remove the casting frame, set aside and allow to fully dry for around 24-48 hours.
8. Brush off the sand using a paintbrush, you can also lightly rinse the cast to remove remaining sand if you wish.
9. Check out your impression!

